The cardiac cycle

-Again, this is a sequence of events that is repeated with each and every cardiac beat

-These events are repeated every 0.8 sec which is the duration of the cardiac cycle.

-Each cardiac beat starts with atrial contraction (0.15 sec) followed by ventricular contraction (0.3 sec.) then the whole heart relaxes all together.

-The cardiac cycle is repeated as follows:-

A- Atrial systole phase.

B-Ventricular contraction which is subdivided into the following phases:-

1- Isometric contraction phase.

2- Maximum ejection phase.

3- Reduced ejection phase.

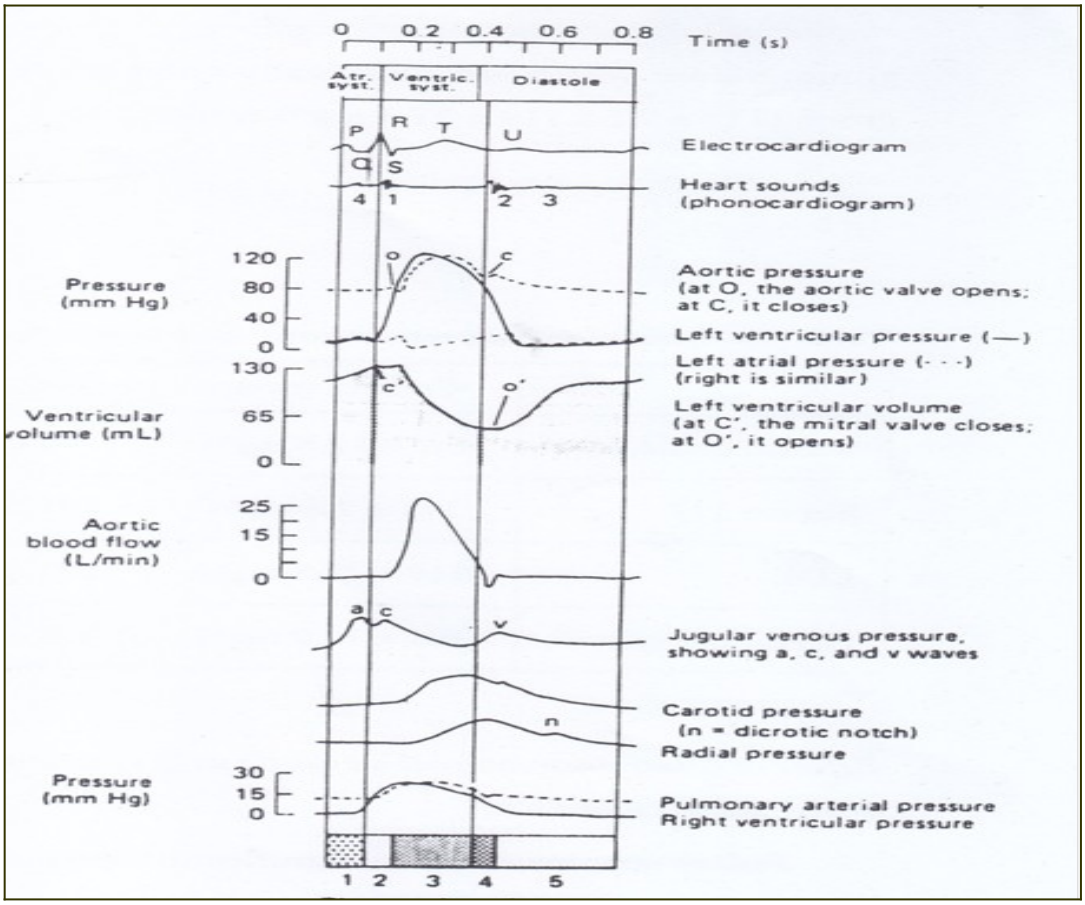
C-Relaxation of the whole heart: which occurs as follows:-

1- Proto-diastolic phase.

2- Isometric relaxation phase.

3- Maximum filling phase.

4- Reduced filling phase.



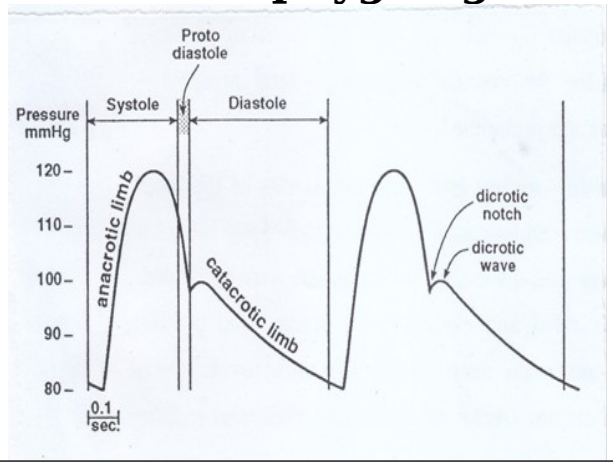
	Atrial Contraction	Ventricular Contraction (0.3 sec.)			Whole cardiac relaxation (0.4sec.)			
	Atrial systole	Isometric contraction	Maximum ejection	Reduced ejection	Proto-diastolic	Isometric relaxation	Maximum filling	Reduced Filling
1-Duration	0.15 sec.	0.05 sec.	0.15 sec.	0.10 sec.	0.04 sec.	0.06 sec.	0.1 sec.	0.2 sec.
2-Main event	The atria contracts to pump 25% of vent. Filling volume	The ventricles contract without any change of volume.	The ventricles contract ejecting blood at the maximum speed.	Rate of blood flow decreases.	It is the time that elapses between the end of cont. and aortic valve closure.	The ventricle relaxes without any change of volume.	Blood flow to the ventricles at the maximum speed.	Blood flow to the ventricles at a slower speed.
3-State of valves:- -AVV:-	Opened	Closed					Opened	
-Semi-lunar:	Closed		Opened			Closed		
4-Lt. vent. volume	Rapid increase	No change	Rapid decrease	Slow decrease	_____	No change	Rapid increase	Slow increase
5-Lt. vent. pressure	Transient increase	Rapid increase from[0]up to[80]mmHg	Slower increase from[80]up to[120]mmHg	Just above the aortic pressure.	Decreases below the aortic pressure.	Rapid decrease down to zero	Gradual increase.	Near zero
6-Venous pressure curve	Ascending limb of[A]	Ascending limb of[C]	Descending limb of [C]	Ascend. [V]	Ascending limb of [V]		Descending limb of[V]	No change
7-Arterial pressure curve	Catacrotic limb		Anacrotic limb	_____	Dicrotic notch	Dicrotic wave	Catacrotic limb	

8-Heart sounds	S4	S1	S1	No sound	No sound	S2	S3	No sound
9-ECG	P&Q waves	R wave	ST segment &T wave	T wave	T wave		TP segment	TP segment

Cardiac cycle

-Cyclic changes in the cardiovascular system that take place every 0.8 of a second.

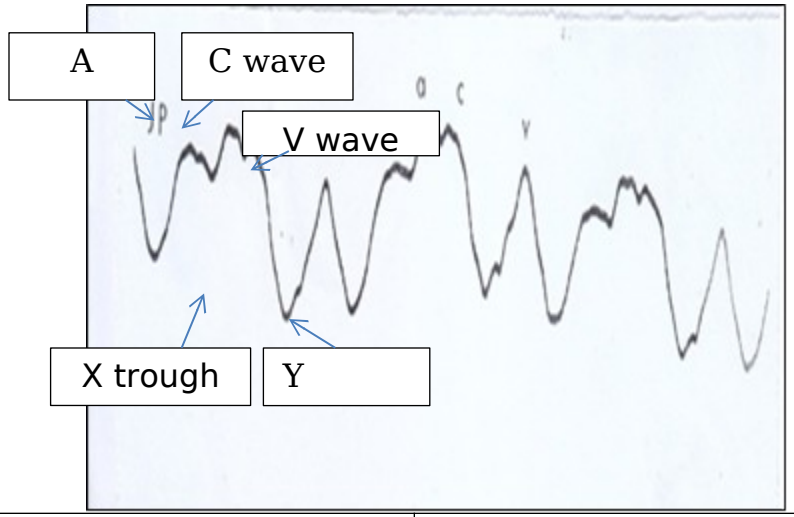
Arterial pulse curve; the arterial sphygmogram:-



Portion of the curve	The cause
The ascending or the anacrotic limb	-Rise of the intra-arterial pressure due to ejection of blood from the left ventricle into the aorta.
The descending or the catacrotic limb	-Drop of the intra-arterial pressure due to passage of blood from the arterial to the venous side of the circulation
The dicrotic notch or the incisura.	- It occurs during the descent of the catacrotic limb due to the flowing back of blood to shut off the aortic valve.

The dicrotic wave	-Transient slight rise of the arterial pressure due to the following causes:- 1-Bouncing of the blood back to the main stream. 2-Elastic recoil of the aorta.

The venous pulse curve:-



Portion	Cause
1. Ascending A	Atrial systole.
2. Descending A	Blood flowing into the right ventricle.
3. Ascending C	Upward bulge of the tricuspid valve during isometric contraction.
4. X trough; Descending C	Downward bulge of the tricuspid valve during

	maximum ejection.
5. Ascending V	Accumulating VR in right atrium.
6. Y trough or Descending V	Atrioventricular rapid filling.